EXECUTIVE SUMMARY

The Lower West Coast (LWC) Water Supply Plan is a guide for addressing future water demands within the LWC Planning Area. This planning area extends across 4,300 square miles in Southwest Florida. The LWC Planning Area includes all of Lee County and portions of Charlotte, Collier, Glades, Hendry, Dade, and Monroe counties.

The plan is intended to set a framework around which water use decisions in the LWC Planning Area can take place within the plan's time horizon between now and the year 2010. The plan's goal is to ensure an adequate supply of water in the LWC Planning Area for all competing water uses deemed reasonable-beneficial, while maintaining the functions of natural systems and the overall quality of water resources.

Total water demand within the planning area is projected to increase by approximately 55 percent from 307 billion gallons per year in 1990 to 475 billion gallons per year in 2010. Urban demand is projected to increase by 90 percent from 72 to 137 billion gallons per year. Agricultural demand is projected to increase by 44 percent from 235 to 338 billion gallons per year. Growth in public water supply is anticipated to be the largest component of increased urban demand. Growth in citrus acreage is projected to be the largest component of increased agricultural demand.

The major factors influencing the availability of water in the LWC Planning Area include: (1) dependency upon rainfall falling within the planning area, (2) limited surface water sources, (3) protection of water resources and associated natural systems, and (4) pressure on these resources from increasing urban and agricultural demands. Competition among users of water is potentially another factor. These issues were addressed in a series of 12 meetings with the LWC Advisory Committee that included 49 people representing environmental groups, local governments and water users in the planning area.

Increasing urban and agricultural water demands have the potential to adversely impact the region's environment and water resources. Resource protection criteria were developed for this plan to address three potential problems related to increasing ground water demand. These problems are wetland protection, intrusion of seawater into aquifers, and general protection of aquifers from excessive drawdowns. The resource protection criteria were used with ground water flow models to evaluate: (1) the potential areal extent where resource protection criteria could not be met in the future using different water demand levels, and (2) the effectiveness of several alternative water supply scenarios in reducing the total area where resource protection criteria had not been met.

The resource protection criteria established limits for the severity and duration of declines in ground water levels based on a drought of a prescribed return frequency. The drought event selected for all of the resource protection criteria had a return frequency of one in ten years. The criteria specified that ground water levels should not decline below each of the criteria levels except for limited durations of time.

Ground water flow models were used to evaluate the extent to which the resource protection criteria could be met while satisfying the urban and agricultural water demands. Model simulations were made for average rainfall conditions and for drier conditions representing a drought with a return frequency of approximately one in

ten years. The models simulated ground water levels in the shallow aquifers (Surficial and Intermediate aquifer systems) of Lee, Collier, and Hendry counties because most of the growth in urban and agricultural water demand is projected to be supplied from these sources.

Two water demand levels were examined using the ground water models: (1) the 1990 permitted demand level, and (2) the 2010 projected demand level. The 1990 permitted demand level represents the total water demand that was permitted by the District through the end of 1990. The urban demand component of the 1990 permitted demand level was approximately equivalent to the actual urban demand in 1990; however, the calculated agricultural demand component was considerably higher than the actual agricultural demand because more agricultural acreage was permitted in 1990 than was actually planted. The 2010 projected demand level is based on estimates of population and the acreage that will actually be irrigated in 2010. The total agricultural demand component of the 2010 projected demand level is only slightly higher than the total agricultural demand component of the 1990 permitted demand level.

The modeling results showed areas where the resource protection criteria were not met for both the 1990 permitted demand level and the 2010 projected demand level (see note at end of Executive Summary). The wetland protection criterion was exceeded during the 1-in-10 drought for approximately 50,000 acres of wetlands (9 percent of total wetland area) at the 1990 permitted demand level and approximately 73,000 acres (13 percent of total) at the 2010 projected demand level. The seawater intrusion criterion was exceeded in several coastal areas during average and 1-in-10 drought conditions for both the 1990 permitted demand level and the 2010 projected demand level. The general aquifer protection criterion was met at both demand levels for average and 1-in-10 drought conditions with only a few exceptions in the Sandstone aquifer of Lee and Hendry counties.

A number of alternative modeling scenarios utilizing modified supply and demand assumptions were selected for computer simulations using the 2010 projected demand level with both average rainfall and 1-in-10 drought conditions. These modeling scenarios included: (1) removing either all or future public water supply demands from the shallow aquifers; (2) reducing agricultural water use by increasing irrigation efficiency for small vegetables, citrus, or both small vegetables and citrus; (3) increasing use of reclaimed water where it is available; (4) implementing proposed long-term modifications to surface water management in the Big Cypress Basin, (5) removing either all or future public water supplies from the shallow aquifers in addition to increased use of reclaimed water (a combination of alternatives 1 and 3); and (6) removing either all or future public water supplies from the shallow aquifers, increasing agricultural efficiency for small vegetables and citrus, and increasing use of reclaimed water.

None of the individual modeling scenarios were successful in eliminating all problems in meeting the resource protection criteria in the modeled portion of the LWC Planning Area. However, the modeling results showed that all of the scenarios, either individually or in combination with other scenarios, did help to meet one or more of the resource protection criteria.

All of the modeling scenarios resulted in decreases in the wetland problem areas within the LWC Planning Area. Scenario 6 was the most effective modeling scenario in reducing the total area of wetlands not meeting the wetland protection criterion in both Collier and Lee counties (reductions of 39 percent in Collier County and 70

percent in Lee County compared to their respective 2010 base case runs). Scenario 1 yielded a 38 percent reduction in wetland problem areas if all public water supply demands were removed from the shallow aquifers. A 19 percent reduction in wetland problem areas resulted when only future public water supply demands were removed from the shallow aquifers. Modeling scenario 2 reduced wetland problem areas by 7 percent in the planning area if small vegetables increased their irrigation efficiency, and by only 1 percent if citrus irrigation efficiency was improved. Wetland problem areas were reduced by 8 percent if both small vegetables and citrus increased their irrigation efficiency. Scenarios 3 and 4 reduced wetland problem areas in the planning area by 6 and 2 percent respectively. Scenario 5 reduced wetland problem areas by 39 percent if all public water supplies were excluded from the shallow aquifers and by 22 percent if only future public water supplies were excluded from the shallow aquifers. Scenario 6 reduced wetland problem areas by 48 percent if all public water supplies were excluded from the shallow aquifers and by 31 percent if only future public water supplies were excluded from the shallow aquifers.

Seawater intrusion problems were significantly reduced by modeling scenarios 1, 3, 5, and 6. Scenarios 2 and 4 had little effect upon seawater intrusion. None of the modeling scenarios had any significant effect in reducing problem areas with the general aquifer protection criteria; however, these problem areas were of very limited extent.

This plan makes a number of recommendations for consideration by the District, local governments, and water purveyors in the LWC Planning Area. Four categories of recommendations are provided to address: (1) new water source development, (2) water use efficiency, (3) modification of planning and regulatory strategies to protect water resources and the environment, and (4) research to provide a greater understanding of water resources and the environment.

The following is a preliminary list of recommendations, they are not self-executing and are subject to further refinement as defined throughout this plan. The plan sets the course for staff to explore the recommendations with the understanding that staff will return to the Governing Board with more specific recommended actions upon which the Board will be requested to act. The Board, by directing staff to further explore and develop these recommendations is **not** requiring any member of the regulated community to take any action in response to these recommendations. The recommendations are preliminary in nature.

New sources of water to be explored include:

- the Floridan Aquifer System,
- aquifer storage and recovery projects,
- increased use of reclaimed water, and
- capture of additional surface water runoff.

Water can be used more efficiently by:

- increasing urban and agricultural water conservation,
- eliminating inefficient water use practices,
- revising drainage management systems,

- fostering additional cooperation among local governments and water purveyors, and
- the District identifying specific projects and developing cost-sharing partnerships with public and private water suppliers and local governments.

Potential modifications to planning and regulatory strategies to protect water resources and the environment include:

- identifying and mapping the large, relatively intact natural systems in the planning area and designating these areas as Outstanding Natural Systems,
- in individual cases where competition among users occurs and alternative management techniques are not appropriate, reserving certain sources of water for use by specific user classes in geographically specific areas,
- developing environmental mitigation banks that target ONS lands for protection when other natural lands cannot be adequately protected from development and on-site mitigation is not feasible, and
- revising the District's Basis of Review (BOR) for water use permits to reflect new resource protection criteria.

Additional research should be considered to:

- better understand potential impacts to natural systems,
- better quantify the cost information for certain water supply options, and
- develop water shortage management strategies that are directly tied to the permitting and allocation process.

Note: The planning process includes the evaluation of potential regional impacts of presently permitted and projected demands. This regional perspective does not allow the same level of detail that is inherent to the site-specific regulatory process. The intent of the regulatory process is to ensure that the proposed resource protection criteria will not be violated. Each permit allocation is renewed on a case-by-case basis using detailed analysis to minimize adverse impacts. If a permit allocation violates the resource protection criteria, several steps are taken. First, the withdrawal point is shifted to a new location, and the demand is reduced through application of conservation measures. Next, other sources and/or mitigation could be required. If the resource protection criteria still cannot be met, the allocation must be denied for that location.